

LISTING OF CLAIMS

This listing of claims provided below will replace all prior versions and listings of claims in the application.

1. (Currently amended) A process for producing a poly(methyl methacrylate)-metal cluster composite, which comprises irradiating poly(methyl methacrylate) with ultraviolet radiation to increase reducing power toward a heavy metal compound and subsequently bringing an ultraviolet-irradiated portion of the poly(methyl methacrylate) into contact with a heavy metal compound to form a metal cluster inside the poly(methyl methacrylate) bringing poly(methyl methacrylate) into contact with a heavy metal compound under ultraviolet irradiation,

wherein the poly(methyl methacrylate) is brought into contact with the heavy metal compound in a non-oxidizing atmosphere at a temperature equal to or higher than the glass transition temperature of the poly(methyl methacrylate),

wherein the wavelength of the ultraviolet irradiation is from 250 to 350 nm, and

wherein the dose of the ultraviolet irradiation is from 0.1 to 2 J/cm².

2. (Currently amended) A process for producing a poly(methyl methacrylate)-metal cluster composite, which comprises irradiating a poly(methyl methacrylate) basal plate with ultraviolet radiation to increase reducing power toward a heavy metal compound and subsequently bringing an ultraviolet-irradiated portion of the poly(methyl methacrylate) basal plate into contact with a heavy metal compound to form a metal cluster inside the poly(methyl methacrylate) bringing a poly(methyl methacrylate) basal plate having an ultraviolet irradiated portion into contact with vapor of a heavy metal compound to form heavy metal nanoparticles on the ultraviolet irradiated portion,

wherein the poly(methyl methacrylate) basal plate is brought into contact with vapor of the heavy metal compound in a non-oxidizing atmosphere at a temperature equal to or higher than the glass transition temperature of the poly(methyl methacrylate) basal plate,

wherein the ultraviolet-irradiated portion is formed in a predetermined pattern,

wherein the wavelength of the ultraviolet irradiation is from 250 to 350 nm, and

wherein the dose of the ultraviolet irradiation is from 0.1 to 2 J/cm².

3. (Original) The process for producing a poly(methyl methacrylate)-metal cluster composite according to claim 1 or 2, wherein the heavy metal compound is selected from acetylacetonate complexes of palladium, cobalt or copper.

Claims 4-6. (Cancelled)

7. (Previously presented) The process for producing a poly(methyl methacrylate)-metal cluster composite according to claim 2, wherein the predetermined pattern is formed by masking.

8. (Withdrawn) A patterning material which comprises a poly(methyl methacrylate)-metal cluster composite obtainable by the process according to claim 1 or 2.

9. (Currently amended) A method for patterning metal nanoparticles having a predetermined form on a poly(methyl methacrylate) basal plate, which comprises irradiating poly(methyl methacrylate) basal plate with ultraviolet radiation to increase reducing power toward a heavy metal compound, forming a masking portion having a predetermined form on the poly(methyl methacrylate) basal plate having an ultraviolet-irradiated portion, and subsequently bringing an ultraviolet-irradiated portion of the poly(methyl methacrylate) into contact with a heavy metal compound to form a metal cluster inside the poly(methyl methacrylate) then bringing the plate into contact with vapor of a heavy metal compound to form metal nanoparticles on a non-masking portion,

wherein the wavelength of the ultraviolet irradiation is from 250 to 350 nm, and

wherein the dose of the ultraviolet irradiation is from 0.1 to 2 J/cm².